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# СИСТЕМЫ ТЕСТИРОВАНИЯ

6011, 6012, 6013, 80611, 80612, 80613, 80614,  
8125, 17020 17030, 17040, 17202-5-20, 17202-5-30,  
17212R-5-100, 17216M-10-6

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## ТЕХНИЧЕСКИЕ ХАРАКТЕРИСТИКИ

По вопросам продаж и поддержки обращайтесь:

|                             |                                 |                                |                           |
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| Астрахань (8512) 99-46-04   | Кемерово (3842)65-04-62         | Орел (4862)44-53-42            | Сургут (3462) 77-98-35    |
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| Вологда (8172)26-41-59      | Магнитогорск (3519)55-03-13     | Самара (846)206-03-16          | Уфа (347)229-48-12        |
| Воронеж (473)204-51-73      | Москва (495)268-04-70           | Санкт-Петербург (812)309-46-40 | Хабаровск (4212) 92-98-04 |
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| Ижевск (3412)26-03-58       | Нижний Новгород (831)429-08-12  | Симферополь (3652) 67-13-56    | Ярославль (4852)69-52-93  |
| Казань (843)206-01-48       | Новокузнецк (3843)20-46-81      | Смоленск (4812)29-41-54        |                           |

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## Timing / Noise Analyzer

power supply automatic test system model 8000 provides a unique timing / noise analyzer, Model 6011/80611/80614. Its modular design allows users to expand up to 10 input measurement modules. Each module is capable of measuring timing period and noise level. Furthermore, it also provides 16 bits TTL signals and 8 pairs of floating relays for external control. Meanwhile, the 10 multiplexer inputs and 1 DMM further extend the Mode 80611 for advanced measurement requirements.

| Timing/Noise Analyzer       |                       |                      |                    |
|-----------------------------|-----------------------|----------------------|--------------------|
| Model                       | 6011                  | 80611                | 80614              |
| NO. of input module         | Up to 10              | Up to 10             | Up to 4            |
| Noise measurement range     | 2V/0.4V               | 2V/0.4V              | 2V/0.4V            |
| Low Pass Filter             | Up to 20MHz           | Up to 20MHz          | Up to 20MHz        |
| Input circuit               | Differential input    | Differential input   | Differential input |
| Timing range                | 0.64 second           | 0.64 second          | 0.64 second        |
| NO. of trigger input        | 4 sets                | 6 sets               | 6 sets             |
| NO. of comparator           | 2 input module        | 4 Input module       | 4 input module     |
| Controllable TTL bits       | 16 output             | 16 output / 16 input | No                 |
| Controllable floating relay | 6                     | 8                    | 6                  |
| NO. of multiplex input      | 10                    | 10                   | No                 |
| NO. of multiplex output     | 2 for DMM & 2 for DSO | 1 for DMM            | No                 |



## Short Circuit / OVP Tester

Short circuit / OVP tester provides model 6012 and 80612 versatile tools for OVP/ UVP/ Short circuit. Its unique programmable impedance makes it ideal to simulate OV / UV situation on various types of power supplies.

| Short Circuit/OVP Tester       |                     |                     |
|--------------------------------|---------------------|---------------------|
| Model                          | 6012                | 80612               |
| NO. of input terminal          | Up to 6             | Up to 6             |
| Short circuit impedance        | <0.1 ohm            | <0.05 ohm           |
| Short current measurement      | Yes                 | Yes                 |
| Sync. Signal for short circuit | 6 relay signal      | 6 relay signal      |
| OVP/UVP testing                | Internal / External | Internal / External |
| Internal impedance range       | 1K 1M ohm           | 100 1M ohm          |
| External OVP/UVP source        | DC source           | DC source           |
| Measurement Capability         | By external DMM     | Internal            |
| Control Interface              | Via 6011            | RS 485              |



## ON/ OFF Controller

ON / OFF controller Model 6013 and 80613 are used to control AC and DC inputs simultaneously. Meanwhile, it can control AC to turn on and off at any phase angle and measure the input inrush current of the UUT.

| ON/OFF Controller      |                 |           |
|------------------------|-----------------|-----------|
| Model                  | 6013            | 80613     |
| Input                  | AC/DC           | AC/DC     |
| ON/OFF range - AC      | 0-360 deg       | 0-360 deg |
| Voltage range - AC     | 250V            | 277V      |
| Current range - AC     | 30A             | 30A       |
| Voltage range - DC     | 200V            | 200V      |
| Current range - DC     | 40A             | 60A       |
| Measurement Capability | By external DMM | Internal  |
| Control Interface      | Via 6011        | RS 485    |



## Digital Multi-Meter & Storage Oscilloscope

power supply auto test system model 8000 is capable to support Chroma12061, Agilent 34401A / 34970A and Keithley 2700 series DMM and most of Tektronix Scopes. Other DMM and DSO are supported upon request.

### SELECTION GUIDE

| Model / Applications / Equipment | PC Power Supply          | Server Power Supply        | Adapter/Charger     | Telecom Power Supply            | DC-DC Converter            | Industrial Power Supply    |
|----------------------------------|--------------------------|----------------------------|---------------------|---------------------------------|----------------------------|----------------------------|
| AC Source                        | 61500, 61600, 6400, 6500 | 61500, 61600, 6400, 6500   | 61500, 61600, 6400  | 61500, 61600, 61700, 6400, 6500 | -                          | 61500, 61600, 6400, 6500   |
| DC Source                        | 62000H, 62000P           | 62000H, 62000P             | 62000H, 62000P      | 62000H, 62000P                  | 62000H, 62000P             | 62000H, 62000P             |
| Digital Power Meter              | 66200                    | 66200                      | 66200               | 66200                           | 66200                      | 66200                      |
| Electronic Load                  | 63600, 6310A, 6330A      | 63600, 6310A, 63200, 6330A | 63600, 6310A, 6330A | 63600, 63200, 6330A             | 63600, 6310A, 63200, 6330A | 63600, 6310A, 63200, 6330A |
| Timing Noise Analyzer            | 6011, 80611, 80614       | 6011, 80611, 80614         | 6011, 80611, 80614  | 6011, 80611, 80614              | 6011, 80611, 80614         | 6011, 80611, 80614         |
| Short / OVP Tester               | 6012, 80612              | 6012, 80612                | 6012, 80612         | 6012, 80612                     | 6012, 80612                | 6012, 80612                |
| ON/OFF Controller                | 6013, 80613              | 6013, 80613                | 6013, 80613         | 6013, 80613                     | 6013, 80613                | 6013, 80613                |
| DSO                              | User Selectable          | User Selectable            | User Selectable     | User Selectable                 | User Selectable            | User Selectable            |
| DMM                              | -                        | User Selectable            | -                   | User Selectable                 | -                          | User Selectable            |
| Other Instrument                 | -                        | -                          | -                   | Voice Band/RF Noise Meter       | -                          | -                          |

# Switching Power Supply ATS

Model No.

# 8200



Power Supply Auto Test System model 8200 provides complete solution for PC ATX power supply, adapter and battery charger testing. The application oriented system structure makes it the most cost effective test equipment for initial test in power supply production line.

To meet the power supply test requirements, Power Supply Auto Test System model 8200 has built in 20 ready-made test items. Users can simply enter the test conditions and test the power supply features while proceeding.

With the report and management functions, Power Supply Auto Test System model 8200 is able to provide versatile tools to establish test documents and perform system administration.

Meanwhile, Power Supply Auto Test System model 8200 can be upgraded to model 8000, the ultimate power supply auto test system, to fit the future test needs by changing system software and adding new hardware devices.

## Switching Power Supply ATS Model 8200

### KEY FEATURES

- User editable test program
- User editable report format
- User authority control
- Release control
- Activity log
- Comprehensive hardware modules provide high accuracy repetitive and measurements
- High test throughput by system default test items
- Cost effective
- Windows 98/NT/2000 or higher based software

### TEST ITEMS

1. DC output voltage
2. DC output current
3. Voltage regulation
4. Current regulation
5. Turn ON time
6. Hold-up time
7. Power good signal
8. P/S ON signal
9. Efficiency
10. Input RMS current
11. Input peak current
12. Input power
13. Input power factor
14. Short circuit test
15. Short circuit current
16. OV protection
17. OL protection
18. OP protection
19. In-test adjustment

### SPECIFICATIONS

Accurate and highly reliable hardware devices :

| System Controller |                           |
|-------------------|---------------------------|
| CPU               | Pentium III 600 or faster |
| SRAM              | 256KB                     |
| DRAM              | 512MB or higher           |
| Hard drive        | 8.3GB or higher           |
| CD-ROM            | 40X or faster             |
| Monitor           | 15"                       |
| Keyboard          | 101 keys                  |
| I/O               | Mouse/Print port          |
| System Interface  | GPIB/RS-232               |
| System I/O        | DIO Card                  |
| GPIB board        | NI-PCI GPIB Card          |

| Extended Controller       |                    |
|---------------------------|--------------------|
| MODEL                     | 8125               |
| Input channels for timing | 8 differential     |
| Timing accuracy           | 40 uS              |
| Controllable TTL bits     | 16                 |
| Input circuit             | Differential input |
| Input impedance           | 10M ohm            |
| Output channels for OVP   | 3                  |
| OVP voltage               | 8V/4.8V/16V        |
| Maximum current           | 3A/Channel         |

# Regenerative Battery Pack Test System



## REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17030

Chroma's 17030 is an automated regenerative test system specifically designed for high power battery pack tests. Accurate power sources and measurements ensure test quality suitable for repetitive and reliable testing of crucial battery packs. Applications include incoming inspections capacity validation, production and certification testing.

Chroma's 17030 system architecture offers regenerative discharging designed to recycle the electric energy sourced by the battery pack. This feature saves electricity, reduces the facilities costs, reduces the thermal foot print and provides a green solution by reducing the environmental impact to the planet.

Chroma's 17030 system include a driving cycle simulation function. Since automotive battery packs are used at quick and irregular intervals, the 17030 includes the capability to create seamless transitions between maximum charge and maximum discharge (or maximum discharge and maximum charge) with a rapid 50 ms conversion.

This feature allows for charge/discharge mode simulations of real world driving scenarios. The system simulates the real conditions on the battery pack in its working condition.

Chroma's 17030 system has flexible programming functions and includes Chroma's powerful Battery Pro software. Battery Pro is a user friendly software environment allowing for the creation of a wide range of test scenarios from basic charge and discharge to complex drive cycle testing. Battery Pro's features allows quick and intuitive test development to eliminate the need for tedious scripting or programming by a software developer.

There are multiple safety features built into the 17030 including battery polarity checks, overvoltage protection, overcurrent protection and over temperature protection. In the unlikely event of a power or computer communication loss, the data is securely stored within the system in non-volatile memory thereby protecting against potential data loss and allowing for continuous flow after restart.

### Model 17030

#### Key Features

- Supports high power battery certification : IEC, SAE, GB...etc.
- Regenerative battery discharge, Saves energy, environment-friendly and provides low heat dissipation
- Driving cycle simulator
- Industry Leading Accuracy
- 10ms Data acquisition
- Charge / discharge mode
  - Constant Current
  - Constant Voltage
  - Constant Power
- Customized rating power
  - Voltage range : 10~1200V
  - Current range : 0~1000A
  - Power range : 90~500kW
- System Integration:
  - Chamber Control
  - Multi-channels voltage/temperature measurement (Max 256CH)
  - BMS Communication



## PROTECTION FUNCTION AND DATA RECOVERY

### Safety Protection

- Channel monitoring icon: empty, contact checking, contact check failed, reverse polarity, standby, running, pause, finish, communication error, etc
- Save testing data when PC is down or disconnected
- Save the test settings to resume after the power failure is recovered

## SPECIFICATIONS-1

| Model                                 | 17030 *                                  |   |   |   |   |   |
|---------------------------------------|--|---|---|---|---|---|
| Channel                               | 1  | 2   | 1   | 1   | 1   |   |
| Max Power *1                          | 90kW                                     | 180kW                                     | 180kW                                     | 250kW                                     | 210kW                                     |   |
| Max Power /Per channel                | 90kW                                     | 90kW                                      | 180kW                                     | 250kW                                     | 210kW                                     |   |
| Max Voltage                           | 450V                                     | 450V                                      | 700V                                      | 700V                                      | 900V                                      |   |
| Max Current / Per channel             | 200A                                     | 200A                                      | 300A                                      | 500A                                      | 500A                                      |   |
| <b>Constant Voltage Mode</b>          |  |   |   |   |   |   |
| Voltage Range *2                      | 15-450Vdc                                | 15-450Vdc                                 | 15-700Vdc                                 | 15-700Vdc                                 | 19-900 Vdc                                |   |
| Voltage accuracy                      | 0.1%F.S.                                 | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  |   |
| Voltage resolution                    | 10mV                                     | 10mV                                      | 15mV                                      | 15mV                                      | 20mV                                      |   |
| <b>Constant Current Mode</b>          |  |   |   |   |   |   |
| Maximum Current                       | 200A                                     | 200A                                      | 300A                                      | 500A                                      | 500A                                      |   |
| Current accuracy                      | 0.1%F.S.                                 | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  |   |
| Current resolution                    | 10mA                                     | 10mA                                      | 15mA                                      | 20mA                                      | 20mA                                      |   |
| <b>Constant Power Mode</b>            |  |   |   |   |   |   |
| Max Power / Per channel               | 90kW                                     | 90kW                                      | 180kW                                     | 250kW                                     | 210kW                                     |   |
| Power accuracy                        | 0.2%F.S.                                 | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  |   |
| Power resolution                      | 5W                                       | 5W  | 10W                                       | 20W                                       | 20W                                       |   |
| Current Rising Time (10% to 90% Load) | 10ms with 0.2Ω Resistive load            | 10ms with 0.2Ω Resistive load             | 10ms with 0.2Ω Resistive load             | 10ms with 0.2Ω Resistive load             | 10ms with 0.2Ω Resistive load             |   |
| Ripple Noise (DC Current)             | <1%F.S.                                  | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   |   |
| Overshoot                             | <1%F.S.                                  | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   |   |
| <b>Measurement *3</b>                 |  |   |   |   |   |   |
| <b>Voltage Read Back</b>              |  |   |   |   |   |   |
| range                                 | 0~450V                                   | 0~450V                                    | 0~700V                                    | 0~700V                                    | 0~900V                                    |   |
| accuracy                              | 0.05% rdg.+0.05% F.S.                    | 0.05% rdg.+0.05% F.S.                     | 0.05% rdg.+0.05% F.S.                     | 0.05% rdg.+0.05% F.S.                     | 0.05% rdg.+0.05% F.S.                     |   |
| resolution                            | 10mV                                     | 10mV                                      | 15mV                                      | 15mV                                      | 20mV                                      |   |
| <b>Current Read Back</b>              |  |   |   |   |   |   |
| High range                            | 0~200A                                   | 0~200A                                    | 0~300A                                    | 0~500A                                    | 0~500A                                    |   |
| accuracy                              | 0.1%F.S.                                 | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  |   |
| Low range                             | 0~50A                                    | 0~50A                                     | 0~75A                                     | 0~125A                                    | 0~125A                                    |   |
| accuracy                              | 0.2%F.S.                                 | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  |   |
| resolution                            | 10mA                                     | 10mA                                      | 15mA                                      | 20mA                                      | 20mA                                      |   |
| <b>Power Read Back</b>                |  |   |   |   |   |   |
| Power range                           | 90kW                                     | 90kW                                      | 180kW                                     | 250kW                                     | 210kW                                     |   |
| Power accuracy                        | 0.2% F.S.                                | 0.2% F.S.                                 | 0.2% F.S.                                 | 0.2% F.S.                                 | 0.2% F.S.                                 |   |
| Power resolution                      | 5W                                       | 5W  | 10W                                       | 20W                                       | 20W                                       |   |
| <b>Thermal Sensor</b>                 |  |   |   |   |   |   |
| range                                 | 0°C ~90°C                                | 0°C ~90°C                                 | 0°C ~90°C                                 | 0°C ~90°C                                 | 0°C ~90°C                                 |   |
| accuracy                              | ±0.2°C                                   | ±0.2°C                                    | ±0.2°C                                    | ±0.2°C                                    | ±0.2°C                                    |   |
| resolution                            | 0.1°C                                    | 0.1°C                                     | 0.1°C                                     | 0.1°C                                     | 0.1°C                                     |   |
| <b>AC Input</b>                       |  |   |   |   |   |   |
| Line voltage / Frequency *4           | 3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz |   |   |   |   |   |
| <b>Others</b>                         |  |   |   |   |   |   |
| Audible noise level (in 1m distance)  | Under 80dB                               |   |   |   |   |   |
| Efficiency (Typical)                  | 85%                                      |   |   |   |   |   |
| Interface *5                          | Ethernet                                 |   |   |   |   |   |
| Operation Temperature                 | 0°C ~ 40°C                               |   |   |   |   |   |
| Dimension (H x W x D) *6              | Transformer                              | 1111 x 813 x 686mm / 43.75 x 32 x 27 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch |
|                                       | Power Enclosure                          | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   |
| Weight *7                             | Transformer                              | approx. 465 kg / approx. 1025 lbs         | approx. 710 kg / approx. 1560 lbs         | approx. 640 kg / approx. 1400 lbs         | approx. 710 kg / approx. 1560 lbs         | approx. 710 kg / approx. 1560 lbs         |
|                                       | Power Enclosure                          | approx. 1140 kg / approx. 2500 lbs        | approx. 1600 kg / approx. 3500 lbs        | approx. 1140 kg / approx. 2500 lbs        | approx. 1140 kg / approx. 2500 lbs        | approx. 1270 kg / approx. 2800 lbs        |

## SPECIFICATIONS-2

| Model                                 | 17030 *                                  |   |   |   |   |
|---------------------------------------|--|---|---|---|---|
| Channel                               | 1  | 2   | 1   | 1   |   |
| Max Power *1                          | 250kW                                    | 280kW                                     | 300kW                                     | 500kW                                     |   |
| Max Power / Per channel               | 250kW                                    | 140kW                                     | 300kW                                     | 500kW                                     |   |
| Max Voltage                           | 900V                                     | 700V                                      | 700V                                      | 1200V                                     |   |
| Max Current / Per channel             | 500A                                     | 200A                                      | 1000A                                     | 700A                                      |   |
| <b>Constant Voltage Mode</b>          |  |   |   |   |   |
| Voltage Range *2                      | 19-900 Vdc                               | 15-700Vdc                                 | 15-700Vdc                                 | 30-1200Vdc                                |   |
| Voltage accuracy                      | 0.1%F.S.                                 | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  |   |
| Voltage resolution                    | 20mV                                     | 15mV                                      | 15mV                                      | 30mV                                      |   |
| <b>Constant Current Mode</b>          |  |   |   |   |   |
| Maximum Current                       | 500A                                     | 200A                                      | 1000A                                     | 700A                                      |   |
| Current accuracy                      | 0.1%F.S.                                 | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.1%F.S.                                  |   |
| Current resolution                    | 20mA                                     | 10mA                                      | 40mA                                      | 30mA                                      |   |
| <b>Constant Power Mode</b>            |  |   |   |   |   |
| Max Power / Per channel               | 250kW                                    | 140kW                                     | 300kW                                     | 500kW                                     |   |
| Power accuracy                        | 0.2%F.S.                                 | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  |   |
| Power resolution                      | 20W                                      | 10W                                       | 20W                                       | 40W                                       |   |
| Current Rising Time (10% to 90% Load) | 10ms with 0.2 Ω Resistive load           | 10ms with 0.2 Ω Resistive load            | 10ms with 0.2 Ω Resistive load            | 10ms with 0.2 Ω Resistive load            |   |
| Ripple Noise (DC Current)             | <1%F.S.                                  | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   |   |
| Overshoot                             | <1%F.S.                                  | <1%F.S.                                   | <1%F.S.                                   | <1%F.S.                                   |   |
| <b>Measurement *3</b>                 |  |   |   |   |   |
| <b>Voltage Read Back</b>              |  |   |   |   |   |
| Range                                 | 0~900V                                   | 0~700V                                    | 0~700V                                    | 0~1200V                                   |   |
| Accuracy                              | 0.05% rdg.+0.05% F.S.                    | 0.05% rdg.+0.05% F.S.                     | 0.05% rdg.+0.05% F.S.                     | 0.05% rdg.+0.05% F.S.                     |   |
| Resolution                            | 20mV                                     | 15mV                                      | 15mV                                      | 30mV                                      |   |
| <b>Current Read Back</b>              |  |   |   |   |   |
| High range                            | 0~500A                                   | 0~200A                                    | 0~1000A                                   | 0~700A                                    |   |
| Accuracy                              | 0.1% F.S.                                | 0.1%F.S.                                  | 0.1%F.S.                                  | 0.2%F.S.                                  |   |
| Low range                             | 0~125A                                   | 0~50A                                     | 0~250A                                    | 0~175A                                    |   |
| Accuracy                              | 0.2% F.S.                                | 0.2%F.S.                                  | 0.2%F.S.                                  | 0.2%F.S.                                  |   |
| Resolution                            | 20mA                                     | 10mA                                      | 40mA                                      | 30mA                                      |   |
| <b>Power Read Back</b>                |  |   |   |   |   |
| Power range                           | 250kW                                    | 140kW                                     | 300kW                                     | 500kW                                     |   |
| Power accuracy                        | 0.2% F.S.                                | 0.2% F.S.                                 | 0.2% F.S.                                 | 0.2% F.S.                                 |   |
| Power resolution                      | 20W                                      | 10W                                       | 20W                                       | 40W                                       |   |
| <b>Thermal Sensor</b>                 |  |   |   |   |   |
| Range                                 | 0°C ~90°C                                | 0°C ~90°C                                 | 0°C ~90°C                                 | 0°C ~90°C                                 |   |
| Accuracy                              | ±0.2°C                                   | ±0.2°C                                    | ±0.2°C                                    | ±0.2°C                                    |   |
| Resolution                            | 0.1°C                                    | 0.1°C                                     | 0.1°C                                     | 0.1°C                                     |   |
| <b>AC Input</b>                       |  |   |   |   |   |
| Line voltage / Frequency *4           | 3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz |   |   |   |   |
| <b>Others</b>                         |  |   |   |   |   |
| Audible noise level (in distance)     | Under 80dB                               |   |   |   |   |
| Efficiency (Typical)                  | 85%                                      |   |   |   |   |
| Interface *5                          | Ethernet                                 |   |   |   |   |
| Operation Temperature                 | 0 °C ~ 40 °C                             |   |   |   |   |
| Dimension (H x W x D) *6              | Transformer                              | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch | 1257 x 1041 x 813mm / 49.5 x 41 x 32 inch |
|                                       | Power Enclosure                          | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 1982 x 1982 x 915mm / 78 x 78 x 36 inch   | 2286 x 5030 x 609mm / 90 x 198 x 24 inch  |
| Weight *7                             | Transformer                              | approx. 710 kg / approx. 1560 lbs         | approx. 710 kg / approx. 1560 lbs         | approx. 710 kg / approx. 1560 lbs         | approx. 1420 kg / approx. 3120 lbs        |
|                                       | Power Enclosure                          | approx. 1270 kg / approx. 2800 lbs        | approx. 1270 kg / approx. 2800 lbs        | approx. 1650 kg / approx. 3640 lbs        | approx. 2270 kg / approx. 5000 lbs        |

**Note\*1 :** Customized rated power : Voltage 10~1200V; max Current 1000A ; Power 90~500kW

**Note\*2 :** The output range of voltage is referred by the cabling. The connection between the device and battery is 3 meters long as standard accessory.

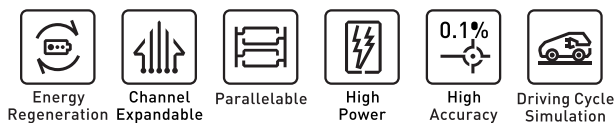
**Note\*3 :** 20us sampling rate for calculating battery capacity and energy

**Note\*4 :** The transformer is for isolation and to accommodate various facility voltages

**Note\*5 :** The interface from PC to 17030 is through Ethernet

**Note\*6 :** The dimension is for reference. The dimensions are subject to change base on real condition

**Note\*7 :** The weight is for reference. The weight are subject to change base on real condition



## REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17040

The 17040 Regenerative Battery Pack Test System is a high precision system specifically designed for secondary battery module and pack tests. It has an energy regenerative function to greatly reduce power consumption during discharge, and ensure a stable power grid without generating harmonic pollution on other devices - even in dynamic charge and discharge conditions. It is capable of recycling the electric energy discharged by the battery module back to the grid reducing wasted energy that is discharged by traditional equipment in the form of heat, thus reducing the HVAC requirements.

The 17040 system has built in parallel channels and dynamic profile simulation functions. The parallel capability increases the charge and discharge current and power to its maximum, thus increasing the efficiency and flexibility of device usage. The dynamic profile simulation allows the user to load a battery waveform of a given drive profile in either current or power mode to meet the NEDC/FUDS requirements. Its bi-directional architecture ensures that the current will

not be interrupted during the charge and discharge transient state so that the driving conditions can be accurately simulated to be in line with the ISO, IEC, UL and GB/T international testing standards.

Equipped with Chroma's powerful "Battery Pro" software, the 17040 system has flexible test editing functions to perform independent channel tests, and conforms to the diversified requirements for testing secondary battery packs with high safety and stability. It also supports power failure recovery functions that ensure test data is not interrupted.

The test system has multiple safety features including Over Voltage Protection, Over Current Protection Check, Over Temperature Protection, and external parameter detection to ensure protected charge/discharge testing on the batteries. Furthermore data loss, storage and recovery are protected against power failure.



## MODEL 17040

### KEY FEATURES

- Conforms to international standards for battery testing: IEC, ISO, UL, and GB/T, etc.
- Regenerative battery energy discharge (Eff. >90%, PF >0.95, I<sub>T</sub>THD <5%)
- Multiple voltage and current ranges for auto ranging function to provide optimum resolution
- High accuracy current/voltage measurement ( $\pm 0.05\%FS/\pm 0.02\%FS$ )
- 2ms current slew rate (-90%~90%)
- Dynamic (current/power) driving profile simulation tests for NEDC, FUDS, HPPC
- Test channel parallel function
- Test data analysis function
- Data recovery protection (after power failure)
- Automatic protection for error condition
- Battery simulator (option)
- High power testing equipment
  - Voltage range : 50~1000V
  - Current range : 0~750A
  - Power range : 0~300kW
- Customized integration functions
  - Integrated temperature chamber
  - BMS data analysis
  - Multi-channel voltage/temperature recording

### FIELDS OF APPLICATION

- Power battery module
- Energy storage system
- Motor driver
- Power control system





## SPECIFICATIONS

| Model                               | 17040                     |         |          |                           |         |          |                           |         |          |       |
|-------------------------------------|---------------------------|---------|----------|---------------------------|---------|----------|---------------------------|---------|----------|-------|
| Max. Power                          | 60kW                      |         |          | 120kW                     |         |          | 180kW                     |         |          |       |
| Max. Voltage                        | 500V                      | 750V    | 1000V    | 500V                      | 750V    | 1000V    | 500V                      | 750V    | 1000V    |       |
| Max. Current                        | 150A                      | 150A    | 150A     | 300A                      | 300A    | 300A     | 450A                      | 450A    | 450A     |       |
| Channel                             | 1                         |         |          | 1                         |         |          | 1                         |         |          |       |
| Constant Voltage Mode               |                           |         |          |                           |         |          |                           |         |          |       |
| Voltage Range                       | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V |       |
| Voltage Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Voltage Resolution                  | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     |       |
| Constant Current Mode               |                           |         |          |                           |         |          |                           |         |          |       |
| Current Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Current Resolution                  | 10mA                      |         |          | 20mA                      |         |          | 30mA                      |         |          |       |
| Constant Power Mode                 |                           |         |          |                           |         |          |                           |         |          |       |
| Power Accuracy                      | ±0.2%FS                   |         |          | ±0.2%FS                   |         |          | ±0.2%FS                   |         |          |       |
| Power Resolution                    | 100mW                     |         |          | 100mW                     |         |          | 100mW                     |         |          |       |
| Battery Simulator Mode              |                           |         |          |                           |         |          |                           |         |          |       |
| Voltage Range                       | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V |       |
| Voltage Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Voltage Ripple (rms)                | < 1%FS                    |         |          | < 1%FS                    |         |          | < 1%FS                    |         |          |       |
| Measurement                         |                           |         |          |                           |         |          |                           |         |          |       |
| Voltage Range<br>(3 Scales as F.S.) | 1                         | 500V    | 750V     | 1000V                     | 500V    | 750V     | 1000V                     | 500V    | 750V     | 1000V |
|                                     | 2                         | 350V    | 500V     | 700V                      | 350V    | 500V     | 700V                      | 350V    | 500V     | 700V  |
|                                     | 3                         | 150V    | 350V     | 450V                      | 150V    | 350V     | 450V                      | 150V    | 350V     | 450V  |
| Voltage Accuracy                    | ±(0.02% rdg + 0.02% FS)   |         |          | ±(0.02% rdg + 0.02% FS)   |         |          | ±(0.02% rdg + 0.02% FS)   |         |          |       |
| Voltage Resolution                  | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     |       |
| Current Range<br>(4 Scales as F.S.) | 1                         | 150A    | 150A     | 150A                      | 300A    | 300A     | 300A                      | 450A    | 450A     | 450A  |
|                                     | 2                         | 75A     | 75A      | 75A                       | 150A    | 150A     | 150A                      | 225A    | 225A     | 225A  |
|                                     | 3                         | 30A     | 30A      | 30A                       | 60A     | 60A      | 60A                       | 90A     | 90A      | 90A   |
|                                     | 4                         | 10A     | 10A      | 10A                       | 20A     | 20A      | 20A                       | 30A     | 30A      | 30A   |
| Current Accuracy                    | ±(0.05% rdg + 0.05% FS)   |         |          | ±(0.05% rdg + 0.05% FS)   |         |          | ±(0.05% rdg + 0.05% FS)   |         |          |       |
| Current Resolution                  | 0.1mA @ 10A Current Scale |         |          | 0.2mA @ 20A Current Scale |         |          | 0.3mA @ 30A Current Scale |         |          |       |
| Power Accuracy                      | ±0.15% FS                 |         |          | ±0.15% FS                 |         |          | ±0.15% FS                 |         |          |       |
| Power Resolution                    | 1mW                       |         |          | 1mW                       |         |          | 1mW                       |         |          |       |

| Model                               | 17040                     |         |          |                           |         |          |       |
|-------------------------------------|---------------------------|---------|----------|---------------------------|---------|----------|-------|
| Max. Power                          | 250kW                     |         |          | 300kW                     |         |          |       |
| Max. Voltage                        | 500V                      | 750V    | 1000V    | 500V                      | 750V    | 1000V    |       |
| Max. Current                        | 600A                      | 600A    | 600A     | 750A                      | 750A    | 750A     |       |
| Channel                             | 1                         |         |          | 1                         |         |          |       |
| Constant Voltage Mode               |                           |         |          |                           |         |          |       |
| Voltage Range                       | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V |       |
| Voltage Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Voltage Resolution                  | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     |       |
| Constant Current Mode               |                           |         |          |                           |         |          |       |
| Current Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Current Resolution                  | 40mA                      |         |          | 50mA                      |         |          |       |
| Constant Power Mode                 |                           |         |          |                           |         |          |       |
| Power Accuracy                      | ±0.2%FS                   |         |          | ±0.2%FS                   |         |          |       |
| Power Resolution                    | 1W                        |         |          | 1W                        |         |          |       |
| Battery Simulator Mode              |                           |         |          |                           |         |          |       |
| Voltage Range                       | 50~500V                   | 50~750V | 50~1000V | 50~500V                   | 50~750V | 50~1000V |       |
| Voltage Accuracy                    | ±0.1%FS                   |         |          | ±0.1%FS                   |         |          |       |
| Voltage Ripple (rms)                | < 1%FS                    |         |          | < 1%FS                    |         |          |       |
| Measurement                         |                           |         |          |                           |         |          |       |
| Voltage Range<br>(3 Scales as F.S.) | 1                         | 500V    | 750V     | 1000V                     | 500V    | 750V     | 1000V |
|                                     | 2                         | 350V    | 500V     | 700V                      | 350V    | 500V     | 700V  |
|                                     | 3                         | 150V    | 350V     | 450V                      | 150V    | 350V     | 450V  |
| Voltage Accuracy                    | ±(0.02%rdg+0.02% FS)      |         |          | ±(0.02%rdg+0.02% FS)      |         |          |       |
| Voltage Resolution                  | 10mV                      | 15mV    | 20mV     | 10mV                      | 15mV    | 20mV     |       |
| Current Range<br>(4 Scales as F.S.) | 1                         | 600A    | 600A     | 600A                      | 750A    | 750A     | 750A  |
|                                     | 2                         | 300A    | 300A     | 300A                      | 375A    | 375A     | 375A  |
|                                     | 3                         | 120A    | 120A     | 120A                      | 150A    | 150A     | 150A  |
|                                     | 4                         | 40A     | 40A      | 40A                       | 50A     | 50A      | 50A   |
| Current Accuracy                    | ±(0.05% rdg + 0.05% FS)   |         |          | ±(0.05% rdg + 0.05% FS)   |         |          |       |
| Current Resolution                  | 0.4mA @ 40A Current Scale |         |          | 0.5mA @ 50A Current Scale |         |          |       |
| Power Accuracy                      | ±0.15% FS                 |         |          | ±0.15% FS                 |         |          |       |
| Power Resolution                    | 10mW                      |         |          | 10mW                      |         |          |       |

# BATTERY CELL CHARGE & DISCHARGE TEST SYSTEM MODEL 17011

The 17011 Battery Cell Charge and Discharge Test System is a high precision system designed specifically for testing lithium-ion batteries (LIB), electrical double layer capacitors (EDLC), and lithium-ion capacitors (LIC). It is suitable for product characteristics screening, cycle life testing, incoming and shipping inspection, material experiment, and balancing battery voltage.

Based on the test characteristics and size of battery current, the 17011 test system has AC/DC bi-directional regenerative series and linear circuit series with precision output and measurement traceability to guarantee product specifications. Small errors among channels and relatively reliable test data are suitable for analyzing the characteristics differences and detecting changes in detail. The system is equipped with energy-saving design and thermal management capable of running stably for long periods and providing reliable real-life testing data. The modular design allows the system to be configured based on test requirements, and each channel can run tests independently with parallel output supported. The test system has high product compatibility and testing flexibility.

In view of energy issues, the fabrication of green products should be in line with production methods that are environmentally friendly. The 17011 AC/DC bi-directional regenerative test system has an energy recycling function that can convert the discharged energy to the charging channel improving power efficiency when in use. The excess power will feed back to grid if the energy recovered is more than the system requires. In addition to decreasing electricity costs, the regenerative power function reduces system heat significantly by lowering air conditioning demands and operation costs. It not only improves system stability, extends service life, but also creates a low carbon emission environment for production.

For small current testing and material development, the 17011 linear circuit series features low noise and precision outputs, with redundant DC power supplies which are more stable and reliable when compared to general switching power supplies. When a power module fails, it will shut down automatically, and the rest of the modules can be paralleled in order to output sufficient power, maintaining a stable power supply. In addition, it supports a hot swap function that allows the malfunctioning module to be switched without shutting down the system to make sure no interruptions occur during testing.

Four current range models are available for material research and development. The standalone device can easily be placed on the lab desk. This device is suitable for precision and leakage current testing with an automatic current shift resolution up to 0.1uA. With data refresh rate up to 1ms in pulse mode, it can perform rapid pulse current charge/discharge tests on various material samples for characteristics verification.

The lithium ion battery cell tests include life and characteristics tests such as ACIR, DCIR and HPPC, etc. The 17011 includes built in test steps in line with regulations that can provide test results fast and accurately without requiring conversion afterwards. It provides easy operation with low chances of human error, and can draw battery characteristic curves via software for specification comparison or application parameter analysis.

For EDLC and lithium capacitors, capacitance, DCIR and leakage current tests are included. The test steps built into the 17011 comply with the standards which get the capacitance and DCIR test results with one step. It also measures the leakage current directly.

## MODEL 17011

### KEY FEATURES

- High precision output and measurement up to 0.02%F.S.
- High sampling rate up to 10ms
- Channel parallel output function with maximum 1200A output
- Operating modes: CC/CC-CV/CP/CR
- Dynamic working condition simulation (current/power)
- Built-in DCIR test
- Built-in HPPC test
- Built-in EDLC capacitance and DCIR test
- Built-in LIC capacitance and DCIR test
- Flexible sampling recording (t, V, I, Q, W)
- Low ripple current
- Real time external circuit resistance monitoring function
- Equipped with redundant DC power supply to avoid affecting the cycle life test due to power failure factor (linear circuit series)
- Energy recycling during discharge (AC/DC bi-directional regenerative series)
- Integrating ACIR test fixture, temperature/data logger and humidity chamber

### FUNCTIONS

- LIB charge/discharge test Capacity, ACIR and DCIR tests
- EDLC charge/discharge test Capacitance, ACIR, DCR and LC tests
- LIC charge/discharge test Capacitance, ACIR, DCR and LC tests

### APPLICATIONS

- Characteristics analysis
- Product life test
- Material test
- Production test
- Voltage adjustment application
- Quality assurance for incoming/shipping inspection



## SPECIFICATIONS

| Module                  | 17202-5-20  |   | 17202-5-30                            |   | 17212R-5-100                                 |                                      | 17216M-10-6                             |   |
|-------------------------|---|---|---------------------------------------|---|--|--------------------------------------|---|---|
| Maximum Voltage/Current | 5V/20A  |   | 5V/30A                                |   | 5V/100A                                      |                                      | 10V/6A                                  |   |
| Maximum Channel         | 2 ch/module, 10 ch/frame  |   | 2 ch/module, 10 ch/frame              |   | 12 ch/set (fixed)                            |                                      | 16 ch/set (fixed)                       |   |
| Parallelable Current    | 40A, 100A, 200A   |   | 60A, 150A, 300A                       |   | 200A, 300A, 400A, 600A, 1200A                |                                      | 6A to 96A                               |   |
| Voltage                 |   |   |                                       |   |  |                                      |   |   |
| Setting Range           | 0 mV ~ 5000 mV, resolution 1mV  |   | 0 mV ~ 5000 mV, resolution 1mV        |   | 0mV~5000mV *1, resolution 1mV                |                                      | 0V~10V or -5V~5V, resolution 1mV        |   |
| Reading Range           | 0.0 mV ~ +5199.9 mV, resolution 0.1mV   |   | 0.0 mV ~ +5199.9 mV, resolution 0.1mV |   | 0.0 mV ~ +5199.9 mV, resolution 0.1mV        |                                      | 0V~10.4V or -5V~5.04V, resolution 0.2mV |   |
| Accuracy                | ± (0.02% rdg.+0.02% F.S.)   |   | ± (0.02% rdg.+0.02% F.S.)             |   | ± (0.02% rdg.+0.02% F.S.)                    |                                      | ± (0.02% F.S. )                         |   |
| Current                 |   |   |                                       |   |  |                                      |   |   |
| Setting Range           | 3A  | 1mA ~ 3,000mA , resolution 1mA          | 4A                                    | 1mA ~ 4,000mA , resolution 1mA          | 100A   | 0.01A ~ 100.00A, resolution 0.01A    | 200μA                                   | 0.1μA ~ 200μA , resolution 0.1μA        |
|                         |   | 20A                                     |                                       | 0.01A ~ 20.00A , resolution 0.01A       |  |                                      | 30A                                     | 0.01A ~ 30.00A , resolution 0.01A       |
|                         | 200mA   |   | 0.1mA ~ 200mA, resolution 0.1mA       | 6A                                      |  |                                      |   | 1mA ~ 6A, resolution 1mA                |
|                         |   | 6A                                      |                                       |   |  |                                      | 0A ~ 6.3mA, resolution 0.2μA            |   |
| Reading Range           | 3A  | 0.0mA~ 3,150.0mA, resolution 0.1mA      | 4A                                    | 0.0mA ~ 4,200.0mA, resolution 0.1mA     | 100A   | 0.000A ~ 105.000A, resolution 0.001A | 200μA                                   | 0A ~ 210μA, resolution 0.01μA           |
|                         |   | 20A                                     |                                       | 0.000A ~ 21.000A , resolution 0.001A    |  |                                      | 30A                                     | 0.000A ~ 31.500A, resolution 0.001A     |
|                         | 200mA   |   | 0.0A ~ 210mA, resolution 0.01mA       | 6A                                      |  |                                      |   | 0A ~ 6.3A, resolution 0.2mA             |
|                         |   | 6A                                      |                                       |   |  |                                      | 0A ~ 6.3A, resolution 0.2mA             |   |
| Accuracy                | 3A  | ± (0.02% rdg.+ 0.02% rng.)              | 4A                                    | ± (0.05% rdg.+ 0.05% rng.)              | 100A   | ± (0.05% rdg.+ 0.05% F.S.)           | 200μA                                   | ± (0.02% rng.)                          |
|                         | 20A   | ± (0.03% rdg.+ 0.03% rng.)              | 30A                                   | ± (0.05% rdg.+ 0.05% rng.)              |  |                                      | 6mA                                     |   |
|                         |   |   |                                       |   |  |                                      | 200mA                                   |   |
| Power                   |   |   |                                       |   |  |                                      |   |   |
| Setting Range           | 15W   | 10 mW ~ 15,000 mW, resolution 1 mW      | 20W                                   | 10 mW ~ 20,000 mW, resolution 1 mW      | 500W   | 0.05W~500.00W, resolution 0.01W      | 2mW                                     | 1μW~2mW, resolution 1μW                 |
|                         |   | 100W                                    |                                       | 0.05 W ~ 100.00 W, resolution 0.01 W    |  |                                      | 150W                                    | 0.05 W ~ 150.00 W, resolution 0.01 W    |
|                         | 2W  |   | 1mW~2W, resolution 1mW                |   |  |                                      |   |   |
| Reading Range           | 15W   | 0.0 mW ~ 15,600.0 mW, resolution 0.1 mW | 20W                                   | 0.0 mW ~ 21,000.0 mW, resolution 0.1 mW | 500W   | 0.000 W~520.000 W, resolution 0.001W | 2mW                                     | 0W~2.1mW, resolution 0.1μW              |
|                         |   | 100W                                    |                                       | 0.000 W ~ 104.000 W, resolution 0.001 W |  |                                      | 150W                                    | 0.000 W ~ 160.000 W, resolution 0.001 W |
|                         | 2W  |   | 0~2.1W, resolution 0.1mW              |   |  |                                      |   |   |
|                         | 60W   | 0~63W, resolution 2mW                   |                                       |   |  |                                      |   |   |
| Accuracy                | 15W   | ± (0.04% rdg.+ 0.04% rng.)              | 20W                                   | ± (0.07% rdg.+ 0.07% rng.)              | 500W   | ± (0.07% rdg.+ 0.07% F.S.)           | 2mW                                     | ± (0.04% rng. )                         |
|                         | 100W  | ± (0.05% rdg.+ 0.05% rng.)              | 150W                                  | ± (0.07% rdg.+ 0.07% rng.)              |  |                                      | 60mW                                    |   |
|                         |   |   |                                       |   |  |                                      | 2W                                      |   |
| 60W                     |   |   |                                       |   |  |                                      |   |   |
| Flow Edit Capability    | Max. step number in one flow: 500 steps ; Max. cycle number in one step: 999999 steps |   |                                       |   |  |                                      |   |   |
| Data Storage            | 10ms~60min *2   |   |                                       |   |  |                                      |   |   |
| Power Supply            | Built in 62015B-24-62 DC Power Supply Module  |   |                                       |   | A691103、A691104 DC/AC Bi-direction Converter |                                      |   | Built in                                |
| AC Input Voltage        | 1Φ, 220V<br>3Φ 4 wire, Δ connection, 220V / 380V                                      |   |                                       |   | 3Φ 4 wire, Δ connection, 220V / 380V         |                                      |   | 1Φ, 220V                                |

Note \*1: The maximum discharge current will derate at low voltage range between 1V to 0V.

Note \*2 : The model 17202-5-20 and 17202-5-30 of 10ms sampling time, the current and power accuracy specification is a bit lower than 100ms.

\* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.



## MODEL 17020

### Key Features

- Regenerative battery energy discharge, efficiency 85%
  - Energy saving
  - Environment protection
  - Low heat generate
- Channels paralleled for higher currents
- Charge/discharge modes (CC, CV, CP)
  - Power Range: 600W, 1.25KW, 2.5KW, 5KW, 10KW, 20kW, 30kW, 50kW, 60KW per channel
  - Voltage Range: 20V, 60V, 100V, 200V, 500V per channel
  - Current Range: up to 2600A (parallel)
- Driving cycle simulation
- High precision measurement
- Fast current conversion
- Smooth current without over shoot
- Test data analysis function
- Data recovery protection (after power failure)
- Independent protection of multi-channel
- BMS data recording
- Thermal chamber control integration

### Applications

- EV battery module
- Electric scooter
- Electric bike
- UPS
- Energy storage battery
- Power tools
- Car battery
- Lead-acid battery

## REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17020

Chroma's 17020 is a high precision system specifically designed for secondary battery module and pack tests. Highly accurate sources and measurements ensure that the test quality is suitable for performing repetitive and reliable tests crucial for battery modules/packs, incoming, and outgoing inspections as well as capacity, performance, production, and qualification testing.

The system architecture of the 17020 offers regenerative discharge capabilities designed to recycle the electric energy sourced by the battery module either back to the channels in the system performing a charging function or to the utility mains in the most energy efficient manner. This feature saves electricity, reduces the facilities thermal foot print, and provides a green solution.

The 17020 system is equipped with multiple independent channels to support dedicated charge/discharge tests on multiple battery modules/packs, each with discrete test characteristics. Channels can easily be paralleled to support higher current requirements. This feature provides the ultimate in flexibility between high channel count and high current testing.

The 17020 advanced hardware design creates seamless transitions between maximum charge and maximum discharge (or

maximum discharge and maximum charge) with a rapid 50 ms conversion. This feature allows for charge/discharge modes that simulate real world scenarios.

The 17020 system has flexible programming functions and may be operated with Chroma's powerful "Battery Pro" software. With the Battery Pro software, cycling tests from basic charge or discharge to complex drive cycle testing can be created and utilized for each channel or channel groups. A thermal chamber control can be integrated into a profile and triggered by time or test results yielding a dynamic profile. Battery Pro's features allow quick and intuitive test development, eliminating the need of tedious scripting or programming by a software engineer.

The 17020 system has multiple safety features including Battery Polarity Check, Over Voltage Protection, Over Current Protection Check and Over Temperature Protection to ensure protected charge/discharge testing. In the unlikely event of power or computer communication loss, data is securely stored in system non-volatile memory protecting against potential data loss and allowing for continuous flow after restart.



## SPECIFICATIONS

| Model                                      | 17020                      |                            |                            |                            |                            |                            |                            |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Voltage                                    | 20V                        | 60V                        | 60V                        | 60V                        | 100V                       | 200V                       | 500V                       |
| Current                                    | 65A                        | 13A                        | 62.5A                      | 62.5A                      | 50A                        | 30A                        | 13A                        |
| Power                                      | 1.25kW                     | 600W                       | 1.25kW                     | 2.5kW                      | 2.5kW                      | 2.5kW                      | 2.5kW                      |
| Channels                                   | 4~40                       | 8~56                       | 4~40                       | 4~24                       | 4~24                       | 4~24                       | 4~24                       |
| Max. Power (Parallelable)                  | 50kW                       | 33.6kW                     | 50kW                       | 60kW                       | 60kW                       | 60kW                       | 60kW                       |
| Max. Current (Parallelable)                | 2600A                      | 728A                       | 2500A                      | 1500A                      | 1200A                      | 720A                       | 312A                       |
| <b>Battery Cycler</b>                      |                            |                            |                            |                            |                            |                            |                            |
| <b>Charge / Discharge Mode per channel</b> |                            |                            |                            |                            |                            |                            |                            |
| Voltage Range*1                            | 0~20V                      | 0~60V.                     | 0~60V                      | 0~60V                      | 0~100V                     | 0~200V                     | 0~500V *3                  |
| Voltage Accuracy                           | 0.1% stg.+<br>0.05% F.S.   | 0.1% stg.+<br>0.05% F.S.   | 0.1% stg. +<br>0.05% F.S.  | 0.1% stg. +<br>0.05% F.S.  | 0.1% stg. +<br>0.05%F.S.   | 0.1% stg. +<br>0.05%F.S.   | 0.1% stg. +<br>0.05%F.S.   |
| Voltage Resolution                         | 0.5mV                      | 1mV                        | 1mV                        | 1mV                        | 3mV                        | 5mV                        | 10mV                       |
| Current*2                                  | 65A                        | 13A                        | 62.5A                      | 62.5A                      | 50A                        | 30A                        | 13A                        |
| Current Accuracy                           | 0.1% stg.+<br>0.05% F.S.   | 0.1% stg. +<br>0.05% F.S.  | 0.1% stg. +<br>0.05% F.S.  | 0.1% stg. +<br>0.05% F.S.  | 0.1% stg. +<br>0.05%F.S.   | 0.1% stg. +<br>0.05%F.S.   | 0.1% stg.+<br>0.05% F.S.   |
| Current Resolution                         | 5mA                        | 1mA                        | 5mA                        | 5mA                        | 5mA                        | 5mA                        | 1mA                        |
| Power                                      | 1.25kW                     | 600W                       | 1.25kW                     | 2.5kW                      | 2.5kW                      | 2.5kW                      | 2.5kW                      |
| Power Accuracy                             | 0.2% stg.+<br>0.1% F.S.    | 0.2% stg. +<br>0.1% F.S.   | 0.2% stg. +<br>0.1% F.S.   | 0.2% stg. +<br>0.1% F.S.   | 0.2% stg. +<br>0.1%F.S.    | 0.2% stg. +<br>0.1%F.S.    | 0.2% stg.+<br>0.1% F.S.    |
| Power Resolution                           | 0.1W                       | 0.1W                       | 0.3W                       | 0.3W                       | 0.5W                       | 0.5W                       | 0.5W                       |
| <b>Measurement per channel</b>             |                            |                            |                            |                            |                            |                            |                            |
| Voltage Range                              | 0~20V                      | 0~60V                      | 0~60V                      | 0~60V                      | 0~100V                     | 0~200V                     | 0~500V                     |
| Voltage Accuracy                           | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. | 0.02% rdg.<br>+ 0.02% F.S. |
| Voltage Resolution                         | 0.5mV                      | 1mV                        | 1mV                        | 1mV                        | 3mV                        | 5mV                        | 10mV                       |
| Current Range                              | 24A/65A                    | 4.8A/13A                   | 24A/62.5A                  | 24A/62.5A                  | 20A/50A                    | 12A/30A                    | 4.8A/13A                   |
| Current Accuracy                           | 0.1% rdg.<br>+ 0.05% rng.  | 0.05% rdg.<br>+ 0.05% rng. | 0.1% rdg.<br>+ 0.05% rng.  | 0.1% rdg.<br>+ 0.05% rng.  | 0.1% rdg.<br>+ 0.05% rng.  | 0.1% rdg.<br>+ 0.05% rng.  | 0.1% rdg.<br>+ 0.05% rng.  |
| Current Resolution                         | 5mA                        | 1mA                        | 5mA                        | 5mA                        | 5mA                        | 5mA                        | 1mA                        |
| Power Range                                | 1.25kW                     | 600W                       | 1.25kW                     | 2.5kW                      | 2.5kW                      | 2.5kW                      | 2.5kW                      |
| Power Accuracy                             | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. | 0.12% rdg.<br>+ 0.07% rng. |
| Power Resolution                           | 0.1W                       | 0.1W                       | 0.3W                       | 0.3W                       | 0.5W                       | 0.5W                       | 0.5W                       |

| <b>Battery Simulator</b>                  |             |
|---|-------------|
| Internal resistance setting               | 10mΩ ~1Ω    |
| <b>Output Noise (0~20MHz)</b>             |             |
| Voltage Ripple(P-P)                       | 0.5% F.S.   |
| Voltage Ripple(rms)                       | 0.1% F.S.   |
| Transient Response Time *4                | 10 ms       |
| Bi-directional Transient Response Time *5 | 20 ms       |
| Road Regulation                           | < 0.1% F.S. |
| Program time *6                           | < 1s        |

| <b>Others - 17020 Power / Channels</b> |        |        |       |        |        |        |       |
|--|--------|--------|-------|--------|--------|--------|-------|
| Voltage                                | 20V    | 20V    | 20V   | 20V    | 60V    | 60V    | 60V   |
| Current                                | 130A   | 260A   | 520A  | 2600A  | 125A   | 125A   | 250A  |
| Power                                  | 2.5KW  | 5KW    | 10KW  | 50KW   | 2.5KW  | 5KW    | 10KW  |
| Channels                               | 2 - 20 | 1 - 10 | 1 - 5 | 1      | 2 - 20 | 2 - 12 | 1 - 6 |
| <b>Model 17020</b>                     |        |        |       |        |        |        |       |
| Voltage                                | 60V    | 60V    | 60V   | 100V   | 100V   | 100V   | 100V  |
| Current                                | 500A   | 750A   | 1500A | 100A   | 200A   | 400A   | 600A  |
| Power                                  | 20KW   | 30KW   | 60KW  | 5KW    | 10KW   | 20KW   | 30KW  |
| Channels                               | 1 - 3  | 1 - 2  | 1     | 2 - 12 | 1 - 6  | 1 - 3  | 1 - 2 |
| <b>Model 17020</b>                     |        |        |       |        |        |        |       |
| Voltage                                | 200V   | 200V   | 200V  | 500V   | 500V   | 500V   | 500V  |
| Current                                | 60A    | 120A   | 60A   | 26A    | 52A    | 156A   | 312A  |
| Power                                  | 5KW    | 10KW   | 30KW  | 5KW    | 10KW   | 30KW   | 60KW  |
| Channels                               | 2 - 12 | 1 - 6  | 1 - 2 | 2 - 12 | 1 - 6  | 1 - 2  | 1     |

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